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Update on Work Packages at TUHH

Miklós Ivicsics and Rebecca Kueny started working as Early Stage Researchers (ESRs) at the Technical University of Hamburg (TUHH) on September 16, 2010 and October 17, 2010, respectively.

Miklós (**work package 3**) has analysed needed parameters and structures considering the needs of cooperation partners (WP5, WP6). He travelled to ITN partners University of Bern and Vienna University of Technology in order to investigate existing designs and principles for the biomechanical testing of spines. From these visits and a literature search he decided on the test rig setup that is going to be built at Hamburg. The machine will be used to perform

tests to determine the load sharing between the anterior and posterior portions of the spine. To reach this goal, additional measurement sensors, beside the connected 6DoF load cell, are needed. By way of example, an appropriate method for determining the forces within the posterior spine has to be developed. Part of the approach could be the measurement of the load transfer by the pedicles using strain gauges.

Rebecca (**work package 9**) has collaborated with ITN industry partner ulrich medical and Dr. Viola Bullmann (SpineFX associated partner) in creating a survey designed to

determine the current surgical opinion on the factors affecting screw loosening (Figure 1). The results of this survey will be used to help direct further research relating to the interface of fixation devices. Currently, Rebecca is also working on a project with Pavel Galibarov (ER, AnyBody Technology). They are creating an AnyBody model of an experimental setup of a five-segment lumbar spine, including the test rig and fixation devices. Furthermore, project planning for a lumbar cadaver experimental model is in progress with BoneSupport.

Rebecca Kueny & Miklós Ivicsics
TUHH

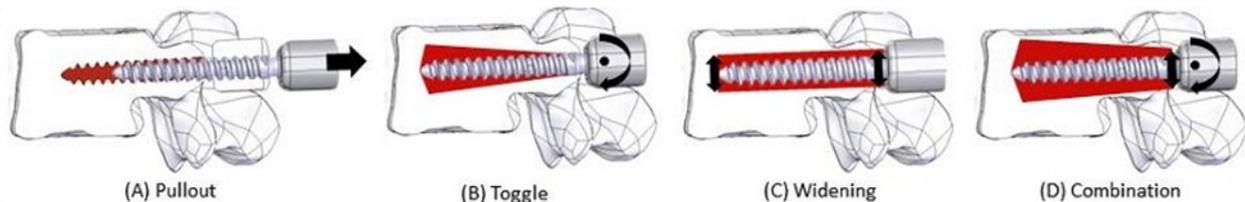


Fig 1. Example figures from the spinal fixation survey for a question designed to determine surgical opinion on the possible screw failure patterns within the vertebral body.



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SpineFX is focused on providing training and research in the area of spinal biomechanics and medical engineering associated with vertebral fracture. The project is a Marie Curie Initial Training Network (ITN), Project Number 238690, and is funded by the European Commission. The network comprises four leading research universities and three companies with a track record in innovation.

The SpineFX ITN will deliver research in three domains: basic science, oriented research, and applied research whilst focusing on three underlining pathologies: osteoporosis, metastases, and trauma. Training is provided by 'experience through research', network-wide workshops, and local professional development provision.



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Focus on Experienced Researcher: Argiris Kasioptas



Argiris Kasioptas is an Experienced Researcher on the SpineFX Project working at BoneSupport.

Argiris, 28, was born in Patras, Greece. He grew up in Volos and returned to his birthplace when he qualified to study chemical engineering at the University of Patras. There, he had the chance to write his diploma thesis under the inspiring guidance of Prof. Petros Koutsoukos on the crystallization of hydroxyapatite on the polymers PMMA and PHEMA, which are used in the fabrication of intraocular lenses for cataract surgery. This involved carrying out constant composition studies in simulated body fluid solutions while training in standard methods used in analytical and inorganic chemistry.

He then undertook his doctoral studies in Münster, North Germany, at the Insitut für Mineralogie, which holds a leading position in its field in Germany. With

supervision from Prof. Andrew Putnis, he investigated the replacement reaction that takes place when phosphate solution comes into contact with calcium carbonates under hydrothermal conditions, and analyzed the reaction product: a hydroxyapatite with morphology identical to that of the starting carbonate material. This reaction has been used to produce bone graft materials with pre-defined structures. Argiris had the opportunity to use state-of-the-art instruments for materials characterization in his experiments, including SEM, AFM, Raman spectroscopy, XRD and participated in the development, as well as the use, of an in-house fluid-cell that allowed novel in-situ analyses with Raman spectroscopy.

Argiris is now enjoying his first R&D position with BONESUPPORT AB, and is very thankful for

the chance given to him through this ITN to continue his research activities in the area of spinal biomechanics, an area of undisputable importance. While currently developing a new injectable bone cement at BONESUPPORT AB, he is using his previous knowledge to overcome the challenges set in his project. The head of research at the company, Eva Lidén, and the project manager, Veronica Sandell, set up an excellent introduction program and he has, since November 2010, integrated fully and is expanding his skills with the aim of applying research to real life.

In his spare time, Argiris likes to play classical guitar, read books and explore wonderful Sweden.

Argiris Kasioptas
BoneSupport